

AVIATION WEEK

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JULY 10, 1950



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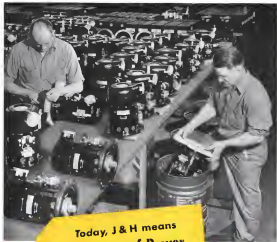
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combustion engineering—is active—for our progress

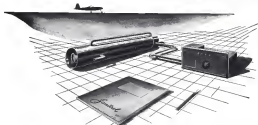
how to keep a gas tank from getting any

HOT IDEAS

Gasoline—like any other combustible material—demands oxygen when it burns. So it has long seemed like a good idea to keep oxygen out of aircraft fuel tanks and thus keep gasoline a liquid and not a perilous aerosol.

Good theory, but how to apply it has posed a good many experts. Now, from one laboratory, comes a preliminary answer: a dry combustion-type burner to burnish "purge gas" (oxygen-free gas) to fuel tanks—and then, at all times, to throw the heat away!

A lot of Sylvania Corporation's has focused how-to-do-it experiments went into this generic design: how to insure proper ignition, how



to maintain a constant fuel-air ratio at all altitudes, how to keep the "purge gas" dry and free of oxygen, how to insure safety under all conditions—and how to do all this in a "fly weight" compact system.

Many of these problems were not new to Sylvania Combustion engineers—many already solved in the development of aircraft heating equipment that has served well the world since. Then we find new developments with the everything expected of it, and make an important contribution to aviation progress.

If any of your problems involve combustion—whether heat is an end-product or a by-product, you'll do well to bring them to Sylvania Combustion.

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BRISTOL BRABAZON'S smooth lines take the tremendous size of the 110-man airliner. But passengers will find that the cabin's...



INTERIOR IS SPACIOUS Note complex test apparatus. Entrance here.

Bristol Brabazon Displays Size Inside and Outside



AMPLE LEG ROOM in 36-passenger cabin (left) and plenty of headroom (right). Seats are easy and adjustable. The Brab's...



VIEW TO LONDON Airport gaze spectators this view of the class fronted sport afforded by eight bowed 1000 hp Continental engines.



"MOST TERRIFIC AIRPLANE I'VE EVER FLOWN"

says PAUL MANTZ, famed intercept speed and movie pilot,
2-time Bendix Trophy Race winner

"Ryan's way out from this year with the Navion Super 260," continues Mr. Mantz, "I've never seen anything like it in my life. Two minutes to 10,000 feet! That gives you an idea of its phenomenal performance. Its big and powerful . . . it cruises at 170 mph, yet lands at a measurably slow 55 mph with full load and no wind! In every way it beats everything I've ever flown. It has both maximum performance and maximum safety. Anyone can fly it easily and safely. Its high altitude performance is amazing. Soundproofing, ventilation, the radio, interior appointments . . . everything is perfect. And that seven-cylinder 260 h.p. Lycoming engine it drives the new Hi-Crane propeller through silent reduction gearing, at low RPMs for maximum efficiency and reduced noise level!"

"The Super Navion is an outstanding in its class as

the P-51 Mustang is among piston-engine fighters. And no wonder! They're both products of real engineering leadership. With its 1250 rpm rate of climb, fast cruise and 18,000 foot ceiling, the Super Navion has the same 'get up and go!' like so much in my P-51. It gets off like a scared peckin' in just 400 feet . . . in 770 feet I was over a 50-foot obstacle with full load and no wind! And I heard all this in a big, roomy, strong, full-lined big-man airplane that justifies the greatest use of mind. Only in the Ryan Super Navion can you find this wonderful combination."

"Never before has there been a plane of such quality . . . such outstanding performance in every way . . . a plane so thoroughly reliable and serviceable. To combine all that in full measure is a unique accomplishment!"

Ryan Navion

NO OTHER PLANE COMBINES SO MANY FEATURES SO WELL

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The ideal plane for those who want modern, safe air transportation at minimum cost. Features 185 h.p. Continental engine, two 55 or 60, cargo space, the 1825 lb payload with full loads. Ideal for residents, contractors, etc.

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Room for four big people with plenty of luggage or other up to 4 permits carrying seven in flight. Specially soundproofed and ventilated. Equipped with dual controls, VHF radio, and 8-gal. fuel and easy to fly.

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Rely on Ryan RYAN AERONAUTICAL COMPANY, 527 LINDBERGH FIELD, SAN DIEGO, CALIFORNIA

WHO'S WHERE

In the Front Office

J. V. Nash has been appointed vice president for Consolidated Vultee Aircraft, the last director of sales and marketing for Convair since March 1959. Nash has also been associated with Northrop as well as several management capacities.

John O. Treuting, formerly vice president Boeing Airplane Co., has been named as vice president of the company's newly set up research & development division. He has managed a number of divisions previously under the former division. Treuting came to Boeing in 1938. His new staff will, he says, be James A. Young, corporate vice president since 1942.

Harold E. Brown has been appointed to the new position of safety research officer for the Flight Safety Foundation. The newly named position will enable FSB to extend its service by carrying on more research of persistent aviation safety material in its various publications and to handle increasing requests for specific safety data. Brown was formerly in the director of the Structural Aeronautical Research Service and managing editor of the Aeronautical Engineering Review.

Changes

With the McDonnell-John J. Dietz and Joseph A. Gault have been appointed chief engineers and chief engineers, respectively, of McDonnell's new divisions. Thomas A. Johnson, Jr., J. H. Janitz, Jr., and new Navy sales engineer for Glenn L. Martin Co., L. E. McQuinn.

The Westinghouse Co. to become chief engineer of the aviation division. George R. Stinson has been named director of Boeing's newly formed engine division, and will have as his assistant Donald J. Feller. C. Ashley Woodhead has been named purchasing agent for Walter Koike & Co.

With the Lockheed-Douglas Delivery has been named Air France's vice president manager for the North American and Caribbean Division. His former position of chief traffic director manager will be filled by Robert W. King. M. R. Bledley has been appointed United Air Lines' regional vice president. The office has been transferred from Chicago to New York at 10 E. 41 St. Capt. Robert H. Hunsick has been promoted to chief pilot for Delta Air Lines.

Anniversary

Frank Weeks Littlefield, chairman of the board of Lockheed Aircraft Co., has been named as an executive of the corporation. Because of his only interest in aviation, he joined an advisory committee in the company in 1913. The corporation's membership in the National Air Council, the Wings Club and the Society of Automotive Engineers.

INDUSTRY OBSERVER

Prototype of Lockheed Constellation Model 1041 will begin flight tests early this fall. The coach version, 18 ft. longer than its predecessor, will seat 162 passengers. While current models will be equipped with Wright Cyclone 2750 hp engines the plane is equipped with turbo-prop engine installation at 5000 in. available. Scheduled for introduction is for a cruising speed of 420-450 mph. Delivery to Eastern Air Lines at \$1.5 million each is scheduled to begin next June. Ten have been ordered.

Contract to Boeing Aircraft Company for "Flying Boat" (Air refueling transfer system) includes manufacturing and installation about 165 B-29 Superfortresses. Conversion program will continue through 1950 and early 1951. USAF considers other service test quantity designed to give greater flexibility to the various leaders and primarily to meet combat value of military training which is not considered practical by many top USAF brass.

Boeing has begun looking for production of eight-engine 208-52 scheduled for flight test early in 1952 (Aviation Week June 17). While Boeing only has order for two experimental models, company is slowly assembling production and test production tools for B-62 manufacture in an attempt to build direct production test of the plane and in preparation of a USAF change of heart for carrying B-62 production in form of two-engine B-36.

Pacific Parachute Company, Palm Field, Bremont, Washington, is testing a new parachute chute designed to avoid dangerous pendulum motion and to permit heavily laden paratrooper to take to the air from high-speed planes with less shock at the initial opening.

Douglas Aircraft Company is reviewing DC-66 for future turbo-prop engine substitution for any of the purchases who desire the modification. Douglas philosophy is that it is more economical and easier to incorporate when changes in the DC-66 are in production than to design a conversion kit later. Disadvantage in DC-66 is turbo-prop engine showing a slight weight penalty which will have to be absorbed at the cost of payload until the turbo-prop are installed in place of piston engines.

Lockheed Aircraft Corp.'s F-96 all-weather jet intercepter-subsonic fighter is the first production fighter delivered to USAF with afterburners. It is scheduled for production through 1951 on current orders; 110 now authorized out of total 1949 took and an additional 150 from 1950 fixed funds.

Air France has temporarily discontinued its last service in the French West Indies following the signing of airports at Pointe à Pitre, Guadeloupe and Luxembourg. Air France had been using PBY-5A amphibians, which it now is offering for sale. Opening of the airports means Pan American will be able to extend regular service to the area.

Boeing's F-107, Double Diamond-powered jet intercepter plane, has completed flight tests at Edwards, Calif. The aircraft is scheduled to be flown to the British, this is the first aircraft out of a turbo-prop plane. A few days later, the Westland Wyvern F.12 fighter also a turbo-prop plane, began its deck landing trials on the Harbison. The Wyvern is powered by an Armstrong-Siddeley Pylons.

Evolution of assault transport aircraft at Elgin AFB, Ill., delayed for the fourth consecutive time by USAF, calls the Army, which has been protracted cooperative by USAF in ground support needs. Reason for delay is to allow use of the assault troop transport aircraft to use to transport them out of its place to act if it could possibly be converted to assault vehicles.

Town Engineering & Manufacturing Co. has been awarded a \$258,000 contract by Air Materiel Command for modification of 167 aircraft with oxygen supply tanks. Deliveries are scheduled to begin Aug. 1 and be completed in mid-November.



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AVIATION WEEK

New Airway Radio Problem: FM and TV

CAA and FCC studying interference with omniranges by home receiver radiation.

A potentially dangerous traffic jam on the nation's over-loaded radio channels has been precipitated by the recent rapid expansion of survey reception and landing aids, on the one hand, and television and FM broadcasting on the other.

Federal agencies have been meeting, probing the situation for many months, but until recently they have tried to avoid publicity. Now it was a task at hand among radio and private pilots which suggested some aspects of the problem.

■ Radioed Aids Action—Last month, Wayne City, Federal Communications Commission chairman, announced that FM and TV "may be acting as a deadly weapon, interfering with aviation radio and endangering the lives of aviation passengers." His statement followed an appeal by Civil Aeronautics Administrator Delta Ransford for positive FCC action to provide the earliest possible solution to the "grave" interference problem.

Many attributes are now being blamed on interference by home FM stations with VOR navigators (VOR). Well over 100 omniranges are now operating in the U. S., and data use by private pilots and airline pilots is increasing steadily.

Professors CAA engineering reports indicate that between 25 and 50 percent of the near 400 omniranges to be installed along the nation's routes may be affected by the FM interference. Unless prompt remedial action is taken, pilots may lose confidence in the 330 million VOR system once before it is in full operation.

FM (frequency modulation) home navigators with omnirange capabilities are actually small broadcasting stations. Individually their interference output may be small. But when several hundred FM sets within a small area are acting up it can cause trouble for the pilot using VOR.

■ In-Band Too—CAA notes from reports on a particularly serious radio frequency situation involving the Lafayette, Ind., VOR omnirange and FM navigators in the Combsville, Ind., 100-25 miles to the south. Flight checks of the Lafayette VOR had re-

sulted in erratic operation of the course deviation indicators and the claim when the plane was flown over Combsville. Initial investigation and whether the receiver audio output was also reported.

The interference persisted when other flights were made over Combsville using different types of airborne receivers. At first it was believed the interference was due to the inherent omnirange characteristics of the airborne omnirange and the high level of the signal radiated from the Combsville FM station, WTUM.

The FM station operates at 102.9 megacycles with an effective radiated power of 15,000 watts. The Lafayette omnirange operates on 115.5 megacycles.

Subsequent flight tests indicated that the FM broadcasting station's signal levels were not high enough to cause interference. It was also found that the interference with the omnirange continued for a while after the broadcasting station left the air.

■ Cash Established—Separation tests then on the home receiver. Omirange frequency of Combsville FM station made the second measurement is 10.7 megacycles higher than the frequency of the signal to which the receiver is tuned.

When these receivers are tuned to the WTUM signal at 102.9 megacycles, the omirange frequency is 115.5 megacycles—over 100 cycles above the frequency of the Lafayette VOR frequency of 115.5 megacycles. How can the omirange frequency be 115.5 megacycles if the VOR of the omirange amplifier frequency is 10.6 megacycles or if the home receiver is centered slightly to 102.9 megacycles?

Despite CAA's findings, no positive action on the Lafayette-Combsville interference situation has been taken. The Lafayette receiver owners, although FCC is shaking a stick at set manufacturers. Changing the Lafayette omirange frequency might be undesirable because the channel channel was especially selected as being most suitable to interfere with other omniranges in the area.

Reconstruction frequency of the Combsville FM station might also be

changed. But FCC says first is "the way way out" of an individual problem which requires a broader solution.

■ Manufacturing Problem—Overall responsibility, FCC believes, lies on the side of manufacturers. Besides, it won't probably be required to change the frequency of FM broadcasting stations which might indirectly cause interference with VOR through home receivers.

Some hope is seen in the possibility that improvements in VOR equipment may lessen its susceptibility to interference.

FCC has requested definite data on the minimum field strength in megawatts per meter required for normal VOR service, and the voltage ratio of signal to interference which VOR can withstand and still operate satisfactorily.

CAA is making these studies. It is also conducting further investigations to determine the full extent of FM receiver interference with VOR.

FCC could get tough with owners of FM and television stations which have excessive omirange radiation. Besides they could set standards for normal VOR service, and the voltage ratio of signal to interference which VOR can withstand and still operate satisfactorily.

■ FCC Holds Club—Although it pretends otherwise, industry knows that FCC has power to limit the radiation of receivers and took some steps in this direction during the war. Manufacturers have also studied the problem and have suggested "fixing" the standards on a voluntary basis.

FCC, for the radio manufacturers' standards are too lax and asks that they limit observed output.

FCC has great information on the extent of interference omnirange radiation by FM and TV receivers isn't available. But the agency believes it shouldn't be more than a few dollars per new receiver. Older receivers are a knotty problem. The Commission emphasizes that some corrective action is necessary because of the increasing impact of the interference.

■ Guessing Them—Close to 7 million television sets have already been produced and are coming from assembly lines at the rate of 400,000 per month. Despite the threat to new homes, TV stations now as the air standard 101, with another full-scale under construction.

100 MHz, there are more than 3,100,000 FM sites and around 740 FM broadcasting stations.

CAS says it has no power case of FM services interference with today's radio. But it cautions that interference with ILS is theoretically possible, especially in the concentrations of FM sites located in the area of ILS locations.

There have been cases in which TV broadcasting stations have interfered with non-selective airborne radar receivers. Special Committee 44 of the Federal Telecommunications Commission for Air is now preparing a report on this problem.

Wasteline Receiver Interfered—It is believed that only active receivers, such as the AN/ARN-4 and BC-1073 types, are affected. Selective receivers have replaced all instances of this type, but they are still used by private and non-scheduled firms.

Some sophisticated receivers in use are being tested selectively to signals interfering signals.

Television station interference with 75-megacycle radar is said to be serious at Albuquerque, Minneapolis and Kansas City. LaGuardia Field is affected by a few stations.

Washington Strided—CMA made tests in Washington early this year on television channels 4 and 2. Using selective receivers, the test planes experienced no interference from television stations when they were flying directly over them.

When interference occurs, the light in the airborne meteor scanner may flash. But the actual signal of a type receiver must be watched. Therefore, a pilot will not be assigned if he observes the coding and intent to the signal.

Interference by FM broadcasting stations with ILS locations signals has also been noticed. In one case early this year, difficulties arose when an FM station went out of adjustment but later again, selective receivers can sense where the problem is.

Millions Asked for Radar Warning Net

The President has requested \$30,900,000 for the radar warning network and \$6,007,000 for the Russian Radar. The language related missile testing ground for the 1951 fiscal year.

The estimates were submitted to the Senate Appropriations Committee on advising the 1951 fiscal year defense budget.

The funds will permit completion of the major radar unit at a \$168,750,000 project. The \$30,900,000 and the \$10 million provided for the 1950 fiscal year are for the land construction, having a total cost of \$18,750,000. The-

rough facilities required by the program total \$64,500,000. USAF had \$12,100,000 of the equipment on hand, and the remaining \$52,400,000 is being absorbed from USAF procurement funds. In addition, four Naval radar polar ships, costing \$7 million are planned in the program.

USAF now has stopgap stations operating in the Pacific Northwest, the Great Lakes and New England areas. Congress appropriated \$5 million for the Russian Radar project, for testing missiles with range up to 9000 miles, for the 1950 fiscal year. An authorization of \$75 million has been made for the program.

Yugoslavia Stymied On Air Build-Up

(McGuire-Hill World News) Belgrade—This is not on a limb as far as military aviation is concerned. The only military plane in Belgrade and within the strength of this force, is certainly not in a position with the country's military to be considered by the Soviet plane.

The Soviet plane comprising Tito's private jet is made up of Yak fighters, PE-2s (light bombers) and IL-2s (ground attack planes) under the German flag.

Type Prototype—A Yugoslav fighter plane, known as the S-46, is not believed to be out of the prototype stage. At least, it's not in anything resembling mass production. The S-46 is similar to the P-40 as appearance. However, it doesn't have an elliptical front, only the engine mount.

Quality aircraft production that has been located in Belgrade. They are produced at the Borsani plant near Zenica, and at Utrina, near Belgrade.

Standard model is the Aero 2, a two-seat trainer with radial twin engine, mounted and plywood frame with cloth covering. The Yugoslav claim to have developed this plane themselves. However, it closely resembles other planes in the class. Glavost U 8 type is the PE-11. The plane appears to be equipped with Walter Motors motor from Czechoslovakia. Since the Russian-Bole's boycott, some 10 in most Gypsy Motor motor have been received from England.

Other Yugoslav—There are two other versions of the Aero 2. The Aero 2P is equipped for spraying for malaria and pest control, having a tank apparatus in place of one seat. The Aero 2S is simply the Aero 2 equipped with pistonless.

The Yugoslav also make a primary trainer known as the Trakla. Based on the Czech and former German type, it has two seats by side seats. Range is about 280 miles, and cruising about 11,000 ft. Construction is plywood and cloth, airframe weight about 2000 lb.

Tunnel Rush

\$150 million provided by Congress to step up AF and NACA program.

Congress has voted \$150 million to reach completion of high-powered wind tunnel testing facilities for the Air Force and the National Advisory Committee for Aeronautics.

In an unusual session, Congress took the initiative in approving these funds, as requested by the Budget Bureau, in the 1950 fiscal year deficiency bill.

Air Force, \$55 million; \$150 million; and \$15 million contract authority should be step up with the Air Force, according to Development Center in Tennessee.

NACA, \$55 million; cash, to complete construction on three big projects in the NACA phase of the so-called primary wind tunnel program. Air right-hand tunnel at the Ames Laboratory, a four-foot tunnel at the Langley Laboratory and an eight-foot tunnel at the Lewis Laboratory.

Sen. Kenneth McKellar, chairman of the Senate Appropriations Committee, maneuvered the supplemental funds for AFDC, following statements from USAF that a stepped up program would be a desirable one for eliminating overhead and that the rate of AFDC would not be changed from Tennessee, as some still permit.

The statutory authorization for AFDC, amended to be stepped into a \$1 billion limitation, at \$100 million. For the 1950 fiscal year, \$30 million (34 million cash and \$24 million contract authorization) was provided.

The President has requested a 1951 fiscal year allocation of \$15 million. This, together with the \$35-million supplemental provided in the deficiency measure would permit AFDC to be up to six million \$100 million total in construction over the coming year, completing the three projects programmed for the Center.

These are, with the uniquely estimated costs which will be incurred under the speed up plan:

Let engine aircraft chamber, \$45 million, including the cost for supporting facilities. Cost of the chamber, being equipped with machinery captured from the German Motor Works in Germany, is set at \$14,700,000.

Increases in capacity and capability to meet the requirements of the industry are expected to add \$14 million to the cost.

Gas dynamics facility for engine test, \$21,165,000. Cost on the facility is set at \$1,165,000, and no control and supporting construction, at \$4 million.

Propulsion wind tunnel, \$55,510,000. Cost of the tunnel is set at \$12,510,000, and on supporting facilities, at \$21 million.

Of the \$10 million provided AFDC for the 1950 fiscal year, only \$65,500,000 was obligated July 1.

The two eight-foot tunnels NACA will complete with the \$75 million deficiency measure will have speeds up to approximately 3.5 times the speed of sound, and the four-foot Langley tunnel will reach a speed about five times that of sound. Original cost of the three facilities, which will be reduced under the stepped program was set at \$162,245,000.

The Budget Bureau had requested only \$20 million (55 million cash and \$15 million contract authorization) for the NACA phase of the study program.

Neglected Projects—Projects in the NACA program, which will not be taken care of by Congress are:

- A two-foot tunnel at Ames
- A two-foot tunnel at Langley
- Utilities at the three laboratories
- The \$10-million program of research tunnels at universities for training personnel

Authorization for these totaled \$146 million.

The Budget Bureau included \$3,900,000 for the university program in its \$21 million request, but this was stricken out by the House. It was substituted by the Senate, which voted NACA \$75,100,000, but eliminated by conferees in the final bill out to the White House.

British Unveil New Night Fighter (McGuire-Hill World News)

London—Another British jet fighter—the Meteor—has been given the "adaptation" treatment and emerges as a new night fighter, the Meteor NF 11 (Aviation Week, June 26).

The new night fighter made its first flight recently (May 30) from the Baginbun airfield of an instructor, Sir W. G. Armstrong Whitworth Aircraft Ltd., Coventry. It is now in production for the RAF.

The Meteor NF 11 is quite closely adapted from several earlier versions of the Meteor day fighters developed for the RAF by Gloster Aircraft Ltd. But all the design work for the new night fighter was done by Armstrong Whitworth.

The NF 11 makes use of several large portions of the design of the Meteor 8 day fighter version, particularly its wing structure, airframe, and tail section. It picks up also the tandem two-seat cockpit and midline

of the Meteor 7 training version, and adds an elongated canopy that really dominates the front of the fuselage—in case the canopy night-fighting radar.

Big Belly—A large belly tank, is carried, thereby an increase in the fuelled capacity of the jet on dry lighter version. This was pointed up in some cases follows tests of the RAF's jet fighters last summer, when only the Meteor 4 and Vampire 3 were available, with about one hour's flying power in the air.

Like the earlier Meteors, the new NF 11 is powered by two Rolls Royce Derwent 8 turbojet engines. Rated thrust for the Derwent 8 sums at that outstanding-compressor type turbojet is

1500 hp, that of the series 8 has not yet been released.

The "adaptation" treatment was given personally to the de Havilland Vampire jet fighter, according to the DHE 113 night fighter which bears a strong resemblance to an earlier bomber and was powered by a single de Havilland Golden 5500-hp turbojet engine. The DHE 113 was also adapted into a quantity production for the RAF almost immediately.

Thus, the RAF may see two jet-powered night fighters in the air, in succession to the venerable piston-powered Mustang.

The same development has been announced in the U.S. with the Lockheed F-94 streamlining hour the F-86.

Adaptation—The Meteor NF 11 is a new night fighter, the Meteor NF 11 (Aviation Week, June 26).

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Big Belly—A large belly tank, is carried, thereby an increase in the fuelled capacity of the jet on dry lighter version. This was pointed up in some cases follows tests of the RAF's jet fighters last summer, when only the Meteor 4 and Vampire 3 were available, with about one hour's flying power in the air.

Like the earlier Meteors, the new NF 11 is powered by two Rolls Royce Derwent 8 turbojet engines. Rated thrust for the Derwent 8 sums at that outstanding-compressor type turbojet is

1500 hp, that of the series 8 has not yet been released.

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\$600-Million Military Public Works Authorized

A \$56-million expansion of Edwards AFB, Mono, Calif., and a \$19-million expansion of the Langston AFB, Mo., are provided for in the \$600-million military public works authorization signed by the President.

The President has already requested Congress for \$90,126,812 for the Air Force and \$62,938,000 for the Navy to start construction on the authorized projects during the FY73 fiscal year.

The \$26,514,230 allocated to Mexico will provide for base expansion, fuel storage facilities, a rifle and infanterist training facility, weapons and shops, a runway and taxiway, and rocket static test facilities. The \$24,513,330 earmarked for Latin America will be for aviation fuel and oil storage facilities, maintenance shops, fire and crash stations, bomb-handling and storage facilities, satellite improvements, training school buildings, communications and electronic facilities.

A conventional allocation of \$3,114,500 for CofA AFOS, Rome, N. Y., for facilities to carry on electronics research and development work now being performed at the Watson Laboratories, Langston, N. Y., will strengthen out of the authorization in confidence.

Sen. Max Baucus, chairman of the Senate Armed Services Committee, and Rep. Carl Albert, chairman of the House Armed Services Committee, have introduced legislation separately authorizing funds for the Griffin development.

Secretary for Air Thomas Pinderle has reported that \$14 million would be needed by the Air Force to construct, install and ground support test facilities and permanent buildings required to continue at Fairchild. Tydings has announced that a subcommittee, headed by Sen. Lister Hill, will hold hearings on the program in the near future.

Continental Air Force projects authorized as the measure include:

- **Beckwith AFB, Missouri, No. 1.** \$1,100,000 for jet fuel storage and dispensing facilities.
- **Beckwith AFB, No. 2.** \$1,100,000 for jet fuel storage and dispensing facilities.
- **Chapman AFB, Oklahoma.** \$1,100,000 for fuel storage and dispensing facilities.
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• **Edwards AFB, Calif.** \$5,600,000 for expansion of aviation center building including heating, lighting, improvement of roads and communication facilities.

• **Langston AFB, Missouri, No. 1.** \$1,100,000 for jet fuel storage and dispensing facilities.

• **Langston AFB, Missouri, No. 2.** \$1,100,000 for jet fuel storage and dispensing facilities.

• **Langston AFB, Missouri, No. 3.** \$1,100,000 for jet fuel storage and dispensing facilities.

• **Langston AFB, Missouri, No. 4.** \$1,100,000 for jet fuel storage and dispensing facilities.

• **Langston AFB, Missouri, No. 5.** \$1,100,000 for jet fuel storage and dispensing facilities.

• **Langston AFB, Missouri, No. 6.** \$1,100,000 for jet fuel storage and dispensing facilities.

• **Langston AFB, Missouri, No. 7.** \$1,100,000 for jet fuel storage and dispensing facilities.

• **Langston AFB, Missouri, No. 8.** \$1,100,000 for jet fuel storage and dispensing facilities.

• **Langston AFB, Missouri, No. 9.** \$1,100,000 for jet fuel storage and dispensing facilities.

• **Langston AFB, Missouri, No. 10.** \$1,100,000 for jet fuel storage and dispensing facilities.

• **Langston AFB, Missouri, No. 11.** \$1,100,000 for jet fuel storage and dispensing facilities.

• **Langston AFB, Missouri, No. 12.** \$1,100,000 for jet fuel storage and dispensing facilities.

• **Langston AFB, Missouri, No. 13.** \$1,100,000 for jet fuel storage and dispensing facilities.

• **Langston AFB, Missouri, No. 14.** \$1,100,000 for jet fuel storage and dispensing facilities.

• **Langston AFB, Missouri, No. 15.** \$1,100,000 for jet fuel storage and dispensing facilities.

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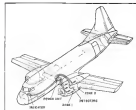
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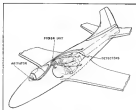
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EQUIPMENT



Fire detector on jet engine plane



Fire detector on jet plane

USAF Buying New Fire Detector

\$10 million to be spent in equipping all aircraft with "Fireys," claimed to be a fool-proof alarm.

The Air Force will soon undertake installation of a new-type fire detector system on all new production transports and smaller aircraft, and modify all smaller existing types from C-47 to B-47. It will cost upwards of \$10 million.

Known as "Fireys," the system is based on a newly perfected reliable gas-type sensor cell and was developed jointly by Photomatrix, Inc., USAF's Air Materiel Command, and CAA's Air Materiel Command, and USAF's Air Materiel Command, and CAA's Air Materiel Command.

Each detector is about the size of a man's thumb and contains a radiant energy sensor cell which reacts to infrared light radiating at a frequency of 10 microns per second.

Turn at CAA and CAA's Air Materiel Command have proven the detector cell sensitive enough to be actuated by a flame from a match or a cigarette lighter, even an incandescent light bulb, or a lighted candle. The cell cannot be actuated by a steady light no matter how intense.

Warning: Only when flames are spotted by the "Firey" an impulse is sent to an amplifier which, in turn, causes a red warning light to flash on the pilot's control panel. The system has no connection with the extinguishing mechanism and is intended solely as an alarm device that for safety.

Foot proof fire detector in aircraft.

always will, become increasingly important with the advent of multi-engine engines and complexity of their associated systems.

In military service, heavy utilization of transporting and jet engines, has proved the need for better fire detectors.

Design Requirements—Three years ago, AMCC issued design requirements for a fire detector device calling for a device capable of detecting a fire in a matter of seconds.

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How It Works—In action, the Fireys detect the presence of its flaming characteristics, and document against ambient light and heat. An electrical circuit is operated by a series of pulses of the radiant energy sensitive cell through the diaphragm of a preset fuselage. A warning signal is not amplified to the pilot until a preset time has elapsed. The circuit is designed to fire per second and is not greater than 20 per second. Continuous light is ignored since it is irrelevant.

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NEW AVIATION PRODUCTS



The product was developed especially to meet demand for a spring alloy that would withstand high stimulating and heat treatment temperatures. Because of high conductivity at this alloy, only half the overlay normally required when soldering copper lead joints is necessary.

It is reported to have high tensile strength and tensile strength of 18-22,000 psi. Hardness is 64-70 Brinell. Available in 0.6, 0.8, 1.0 and 1.5-in. coils.

Electric Cable

Los Angeles-based conductor, 3000-ft-type cable for aircraft electrical systems withstands temperatures up to 483 F and is related to be used in all types of aircraft. Cable was developed by Packard Electric Division of General Motors Corp., Warren, Ohio, and conforms to Bureau of Aeronautics Specification X-21, 38.

Packard cable also has high fatigue and vibration resistance. Conductor is also plated shielded copper encased by glass-reinforced Teflon insulated (see page 10) with an outer shield of Degussa Teflon PE-400, cable is supplied in 1000-ft coils from No. 20 to 8.

Moves Cockpit Canopy

A second addition to the production line of Rhodes Levis Co. is a linear actuator pilot designed to open and close a 150-lb cockpit canopy.

This mechanism features a special clutch and brake arrangement which enables the pilot to stop the canopy quickly in the exact position he desires. When the brake is thrown on, the actuator will lock in about 5 deg. of output shaft rotation.

The 24-in. dia. motor driving the device runs at 1/2 hp at 16,000 rpm. These units already are being shipped to Northrop Aircraft, Inc., the order reports.

The firm also is offering a new line of carbon seal, self-energized, pressure 1 and 4 psi valves (bottom). These are designed for operating pressures of 200 to 1500 psi. The seal is available in 3, 4 and 4 in. tube sizes.

Weight of the 3-in. valve is less than 1 lb in all sizes while 4-in. valves range from 1.5 to 2 lb. Rhodes Levis works in 1652 Eastman Drive, Culver City, Calif.

High Heat Solder

Eutectic 1807 after being alloyed, offered by Electro-Whisper Alloy Corp., 40 West St., New York 13, N. Y., has melting temperature of 1850 F and twice the electrical conductivity of conventional when solder, according to the sales.



Simplified Control

Single variable "FPS" push-pull switch which has single point control of multiple-operation assemblies can be supplied with up to 36 positions on the dial face. Unit permits starting or stopping in any position, and moving from any position to the dial to another without activating interlocking operation.

With this device, any number of interlocking control elements can be arranged to act in place of various push buttons, relays and contactors, according to order. Arrowflex and Elgus are Electro Co., Hartford 6, Conn.

To illustrate how this device cuts costs and simplifies machine shop operations, Arrowflex has this example: By using one, eight position FPS in control of a two-speed conveyor lifting, 7 push buttons and 5 relays were eliminated. Control of this lift was effected through one of the FPS switch and a single relay.

Switch controls of front operating mechanism complete with dial face and handle, followed by the drive and member of rotating axis. A push-pull section is mounted at the back end, having any combination of momentary contacts.

Switch will accommodate up to 15 rotating cam sections. Each section, rated in 36 or 50 spot per second, provides two independent circuits with individual cam. Each section can be used independently of other sections of any position of the switch. And any combination of cam sections can be operated at any position.

In operation of the FPS, pushing handle (1) depresses the better relay before the load and/or control contacts can be changed. Turning handle to another position (2) establishes the new load and/or control mechanism desired. Pulling the handle (3) returns starter relay after desired load and/or control mechanism is made.

Switch also features interlocking without pushing to turn the handle while cam-control circuit means may be pulled up or dropped without shutting down the machine.

Besides its use with multiple-operation machines in aircraft plants, fire belting it may have use in aircraft.

AIR FORCE CONTRACTS

April Awards (Cont.)

The following contracts American Works have been awarded by the Air Force in April. Combinations data is shown where available. Additional contracts will be listed in subsequent issues.

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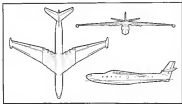
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AERONAUTICAL ENGINEERING



Six-Jet Flying Boat Projected

Saunders-Roe design study contemplates 74-seat, 1300,000-lb. craft for 1300 to 1500-mi. stage.

(McGraw-Hill World News)

London—The flying boat—this time, turboprop-driven—is again a point of controversy in British aviation transport circles (Aeronautics Weekly, May 22).

Following the announcement by Saunders-Roe Ltd., Corva, Isle of Wight, that they had completed a design study for the 74-passenger, turboprop-driven, Dachsen flying boat of 130,000 lb. gross weight, aviation people here have questioned the need for such a project.

But Saunders-Roe feels there is a definite place for the craft in the transport spectrum, they say.

• **The airports of the world can be divided into many different stage lengths.** The Dachsen, for example, is designed for stages of 3000 to 3500 mi. There is a great demand, however, in many parts of the world for aircraft whose greatest economy is achieved on stages of between 1100 and 1300 mi.

• **The Dachsen has been designed to meet this need and embodies the smoothness and speed of the jet with the safety and reliability of the flying boat.**

• **Basic Data:** The Dachsen will be fitted with the de Havilland Ghost jet engine. Span will be 214 ft.; length 274 ft.; maximum payload will be 21,000 lb.

The craft's most economical cruising speed is to be 465 mph, but it will cruise at 500 mph and maximum level speed will be 570 mph.

Application of the S.R.A.C. standard

method for assessing direct operating costs shows a cost per passenger mile of just over one penny (144¢) for the design stage length and that is advanced to considerably more economical than any existing medium range aircraft. This figure is increased to two pence (24¢) on a stage distance of 2000 mi.

• **Swiftness:** Plans for the interior of high speed performance, a wing-fuselage wing and a door more than is normal on a flying boat have been dropped. Because of this latter feature, mooring doors will be carried out from a central point on the starboard side, all of the gate stations.

Admirable pitch boats will react so fast at the wing tips in the same manner as those on the Pegasus. Combined with the split water-reducer they will make the Dachsen extremely easy to handle on the surface. The aircraft will be fully autonomous on a 16-foot sea with moderately rough water.

• **Performance:** The initial 130,000 lb. Dachsen is expected to fly 1000 mi. at sea level under ICAN conditions will be 3600 ft.; for extended tropical conditions, 5000 ft.

With some internal weight, under ICAN conditions initial rate of climb will be 1800 ft./min.; time to 30,000 ft. will be 15 min.

Maximum level speed at 110,000 lb. gross weight will be 570 mph at 32,000 ft.; maximum continuous climb (90 percent maximum rpm) will be 560 mph at 30,000 ft.

At 150,000 lb. initial, maximum

equivalent still air speed will be 590 mph, E.S.A. range with maximum payload will be 2600 mi.

The Dachsen will be capable of sleeping sideways in water when there has been considerable swell in the past. Night landing can also be carried out more satisfactorily because of the wide range of angles at which the approach can be made.

• **Engineering:** Installations—The wing tip floats will be raised and lowered by compressed air rams and the angle in pitch of the floats controlled by similar rams which also set in shock-absorbers. The floats will be operated in the same way and so will the split water-reducer.

The cabin is to be pressurized by tapping the engine compressor and passing the air obtained through humidification and temperature control gear. Protection against any possible fire on the wing leading edge will be by hot gas from the engine, and on the tail unit by a separate heater in the rear of the tail.

All flying controls will be power-operated by the Saunders-Roe power control system. This system provides straightforward, unobscured, unobstructed surfaces, separated into sections for safety, with a large margin of power and great precision. The power system, which are to be adjacent to the surfaces, will be easily removed and replaced.

Main electric supply for lighting, radio, radar, etc., will be generated at 115 v. d.c. by four compound-wound small generators on the center and inboard engines. An auxiliary power unit will be carried for main engine starting and a supply of compressed air and electric energy for some landing, etc.

• **Maintenance:** From the start, the Dachsen design has been intended to provide a high standard of reliability and durability to reduce and make maintenance to a minimum.

The wing surface in the region of the engine will consist of large smoothable panels through which inspection and adjustment is intended to be a very simple matter.

Service will be "powered" so that each item of mechanism can do its job without relying upon another item to "openup." The services in the hull will run under the wing, between the floor and the pressure structure, so that they can easily be reached.

Main legs of the landing gear are to be similar to, but smaller than, those used by the Pegasus and can be raised in a variety of ways. The gear is carefully calculated to carry the weight of the hull's fuselage and to be used for the hull's fuselage and

Aids to Aeronautical Engineering Study*

SCHOOL	TYPE	AMOUNT	DONOR
U. of Alaska	Scholarship	2000	Alma Wagon's Ch.
California Inst. of Technology	Fellowship	900	Nat. Aeron. Assn.
	For Professional Ed. (C)	2000 plus	Boeing Aircraft
	Creative Arts Ed. (C)	1500 plus	Boeing Aircraft
U. of Colorado	Scholarship	250	General Electric
Cornell U.	Fellowship (C)	1200 plus	up to 2100
	Graduate Scholarship	1200	Tufts
	Scholarship	1200	Tufts
Georgia Inst. of Technology	Research Assistant (C)	1000	Guaranty Life
Massachusetts Inst. of Technology	Fellowship	1000	Aviation Week
U. of Michigan	Fellowship	1000	De Post
	Scholarship (C)	500	
	Scholarship (C)	500	Shenley
	Scholarship (C)	500	Curtis-Wright
	Scholarship (C)	500	Curtis-Wright
	Scholarship	500	Curtis-Wright
New York U.	Graduate Fellowship	700	Lock Aircraft
	Isaacs-Mann (C)	500	
	Fellowship (C)	500-1000	
	Aviation (C)	500-1000	
North Texas Ag. Coll.	Scholarship	200	North American
State Univ.	Research Fellowship	200	
	Scholarship	200	Canada
	Fellowship	750	Canada
Ohio State U.	Post-graduate Ed.	1000-1000	
	Post-graduate Ed.	1000-1000	
	Fellowship	400-600	
	Scholarship	400-600	
Yale Univ. Coll.	Fellowship	1200	Hawthorne
Yale Univ. Coll.	For Professional Ed. (C)	2000	Guaranty Life
Southern Meth. U.*	Scholarship	200	State American
Texas A & M Coll.	Scholarship	250	North American
Texas Tech. Coll.	Scholarship	250	North American
U. of Washington	Scholarship	1000	
U. of Wisconsin	Fellowship	800	
	Scholarship (C)	400	Walter Reed

* All students (except male and technical school) offering aeronautical engineering specially selected by the Executive Council for Engineering Education. For details, send info. to accompanying reply.

† Do not give scholarship award in aeronautical engineering.

‡ An aeronautical engineering course shown as B.S.P.D. list.

Industry's Help to Aero Education

Survey discloses aviation manufacturers spend more than \$50,000 a year on fellowships and scholarships.

The aviation industry must draw the engineers it needs for its future progress from only a handful of the 1380 colleges and universities in the United States.

Only 30 of these institutions have dedicated aeronautical engineering curricula, according to the Engineers' Council for Professional Development. Most of these also provide graduate study in aeronautics. Several universities give graduate, but not undergraduate, work in aeronautics.

And only two schools on the accredited list have aeronautical engineering fellowships, only six have scholarship in aeronautical engineering. Some have both.

The aviation industry's support for aeronautical engineering education is the form of fellowships or scholarships comes from only nine companies, plus fellowships awarded as a personal gift of Walter Reed, seven firms in aviation and fellowships, not plus Reed, under scholarships.

Universities offer fellowships and outside grants amount annually 79 fellowships and 94 scholarships in aeronautical engineering.

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• The aviation industry—Spends a minimum of \$10,000 each year on advanced engineering education, it is important to estimate the full amount due to the differing ways the aid is offered.

These are the highlights of Aviation Week's survey of aeronautical engineering education in the U. S., undertaken in connection with the establishment of the Massachusetts Institute of Technology of the Aviation Week Fellowship in Aeronautical Engineering (Aviation Week, June 19).

The survey covered those schools offering undergraduate aeronautical engineering curricula accredited by the Engineer Council for Professional Development, not including strictly trade or technical schools. Of 37 institutions surveyed, 20 replied. As a cross-check, the major airlines and engine manufacturers and six major airports were surveyed.

Several manufacturers, while not extending scholarships or fellowships, have highly interesting and valuable programs in advanced engineering education. Glenn L. Martin Co., for instance, in 1944-45 endowed an aeronautical engineering college at the University of Maryland at a cost of \$2,500,000.

The accompanying tables detail present aids to aeronautical engineering education, as disclosed in the Aviation Week survey. Here's what the principal sources cooperate in doing.

• **Beech-Pratt**—Walter H. Beech has made a personal gift of \$2600 to the University of Wichita. It will set up five four-year scholarships, each worth \$400 a year.

• **Boeing Aircraft Company** practices a to provide advanced education for employees, particularly engineers, who enroll in various aeronautical colleges at company expense.

• **Consolidated Vultee-Sears** 1945 has conducted an engineering fellowships program in cooperation with more than 20 universities and colleges throughout the nation. Company currently is evaluating the program and its benefits before deciding whether to reinstate it, and if so in what form. Some of the schools participating in this program are listed in the table.

• **Currier-Wright-Densted** \$10,000 to University of Michigan for seven \$1000 fellowships and one \$500 scholarship to be awarded over a three-year period to students interested in aircraft programs and in manufacturing.

• **Douglas Aircraft Company** reports "for several years awarded annual scholarship funds varying from \$500 to \$1500 each to certain selected universities and colleges... by our agreement unable to name particular schools." Schools named report

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University, Alabama

California Institute of Technology
Pasadena, California

University of Cincinnati
Cincinnati, Ohio

University of Colorado
Boulder, Colorado

University of Connecticut
Storrs, Connecticut

University of Delaware
Delaware, Delaware

University of Florida
Gainesville, Florida

University of Georgia
Athens, Georgia

University of Illinois
Urbana, Illinois

University of Iowa
Iowa City, Iowa

University of Kansas
Lawrence, Kansas

University of Maryland
College Park, Maryland

Massachusetts Institute of Technology
Cambridge, Massachusetts

University of Michigan
Ann Arbor, Michigan

University of Minnesota
Minneapolis, Minnesota

University of Missouri
Columbia, Missouri

University of Nebraska
Lincoln, Nebraska

University of New York
New York, New York

University of North Carolina
Chapel Hill, North Carolina

University of Oklahoma
Norman, Oklahoma

University of Oregon
Eugene, Oregon

University of Pennsylvania
Philadelphia, Pennsylvania

University of Pittsburgh
Pittsburgh, Pennsylvania

University of Rhode Island
Providence, Rhode Island

University of South Carolina
Columbia, South Carolina

University of Tennessee
Knoxville, Tennessee

University of Texas
Austin, Texas

University of Virginia
Charlottesville, Virginia

University of Washington
Seattle, Washington

University of Wisconsin
Madison, Wisconsin

University of Wyoming
Laramie, Wyoming

Ohio State University
Columbus, Ohio

Pennsylvania State College
State College, Pennsylvania

Purdue University
West Lafayette, Indiana

Rensselaer Polytechnic Institute
Troy, New York

Rice University
Houston, Texas

University of Tennessee
Knoxville, Tennessee

University of Texas
Austin, Texas

University of Virginia
Charlottesville, Virginia

University of Washington
Seattle, Washington

University of Wisconsin
Madison, Wisconsin

University of Wyoming
Laramie, Wyoming

University of Arizona
Tucson, Arizona

University of California
Berkeley, California

University of Colorado
Boulder, Colorado

University of Connecticut
Storrs, Connecticut

University of Delaware
Delaware, Delaware

University of Florida
Gainesville, Florida

University of Georgia
Athens, Georgia

University of Illinois
Urbana, Illinois

University of Iowa
Iowa City, Iowa

University of Kansas
Lawrence, Kansas

University of Maryland
College Park, Maryland

University of Massachusetts
Amherst, Massachusetts

University of Michigan
Ann Arbor, Michigan

University of Minnesota
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Columbia, Missouri

University of Nebraska
Lincoln, Nebraska

University of New York
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Chapel Hill, North Carolina

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University of Oregon
Eugene, Oregon

University of Pennsylvania
Philadelphia, Pennsylvania

•**McDonnell Aircraft-Pitt:** Washington University, St. Louis, Mo., \$10,000 a year in connection with a cooperative aeronautical engineering training course. From June of the sophomore year until September following the senior year, about 20 Washington U. engineering students alternate in groups of two for a term at the plant and then a term at the university. At the end of five years a student receives a master's degree.

•**North American Aviation-In 1945** set up scholarship funds at Southern Methodist University (\$15,000), Texas A&M, North Texas Agricultural College, and Texas State College for Women (\$10,000 each). These funds are awarded by the schools and receive used for scholarships to students selected in areas that will help advance the aircraft industry. The schools decrease the amount of the scholarships (the Texas A&M scholarship at present is for \$150). Scholarships are designated to the memory of NAA Texas employees who lost their lives in the war.

•**TWA-In** now working on an educational program.

•**United Aircraft Corp.-Hamilton** Standard division awards a \$1200 fellowship at Pennsylvania State College. Company now studying a broader program.

•**Westinghouse-Awards 10** four-year scholarships to Carnegie Institute of Technology. Each is valued at \$2200 and may be used for aeronautical engineering as an option to mechanical engineering.

•**Other Aeronautics** the most noteworthy aids to aeronautical engineering education are the du Pont fellowship at MIT and the Cresswell fellowship at MIT. In 1946, the du Pont family established the "National Graduate du Pont Mechanical Fund" of \$168,772 in memory of the noted racing pilot and founder of All American Airways, who was killed testing a plane during the war. The fund provides a monetary fellowship in aeronautics or technology.

The Cresswell fellowships in jet propulsion are awarded annually at Princeton and Cal Tech. Each is worth \$2000 plus tuition and the most recent would cover for one year at Princeton and six at Cal Tech.

In addition to scholarships and fellowships, all of the schools reporting have general aids of that character which can be used in the aeronautical engineering department. A few of the schools will award scholarships or fellowships in specific departments, making general awards for use in any of the school's curricula.

•**Correll Fellowships-Aids** to aeronautical engineering study take a variety of forms. Some are named in honor of Correll University or its people. All



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ter the war, Curtin Wright gave his research facilities at Buffalo to Corvelli, and there became the nucleus of the Corvelli Associated Laboratory Ltd., where cost-conscious manufacturers launched the laboratory working capital to carry on its work.

In return, Corvelli agreed to set up fellowships in honor of those companies, or to conduct research work in the laboratory on company projects. Four companies—Cranston, C.W. Fairchild, Republic—donated the fellowships. Bell, United Aircraft and Avco chose to have work done in the lab. Acord ran the three aeronautical engineering fellowships shown in the table. The fellowship is honor of Republic is for work in electrical engineering.

► **For Women Only**—Among the most interesting scholarships is one for women sponsored by Zents International, with headquarters in Chicago. It is named in honor of Amelia Earhart and is worth \$1000 a year. It is awarded to a woman who holds a bachelor's degree and is for graduate study in engineering with special interest in aeronautics.

Plastic In Metal Role

A new thermosetting plastic which shows promise for substitution in many applications where metal is now used has been developed by United States Rubber Co.

Expectative uses for the material, marketed as "Etemp," are reported to include:

- High-strength gears in heavy-duty lifts, lifting barrels, and in dynamometers
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The company reports that tests made of the material have been operating for more than a year in applications where conventional metal gears have failed in a few weeks.

Other uses for the new plastic are seen in battery cases, electrical insulators, gaskets and bearings, and chemical receptacles.

It can be molded in complicated shapes by compression or transfer methods and is available in sheets, rods, tubes and gear blanks, and in varying degrees of flexibility ranging from elastic units and bottle-handling rubbers.

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*2/100 2/20
2/100 strokes per sec*

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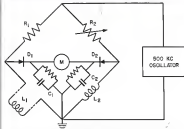


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AVIONICS



Thickness gage relies on probe coil and metal surface distance, regardless of ceramic coating.



Inductance balance adjuster schematic. Capacitor C_1 and resistor in parallel are series connected with crystal diode D_1 . It is connected with probe coil L_1 . Resistor R_1 in L_1 is determined by meter resistance R_2 .

Volume R_2 is proportional to inductance of L_1 . Component voltage is provided by inductor coil L_2 , connected in series current through L_3 , adjusted to give zero reading on galvanometer M .

Gage Detects Coating Thickness

Electronic unit uses probe coil, inductance principal for checking ceramics, paints on non-magnetic metal.

An electronic thickness gage giving simple, direct, non-destructive measurements of non-conducting coatings on ceramics, brass, copper, stainless steel and other slightly magnetic or nonmagnetic metals.

High temperature engine parts. Other uses: thickness determinations of paint, plastic, and other non-conductive films on aluminum, brass, copper, stainless steel and other slightly magnetic or nonmagnetic metals.

Developed by National Bureau of Standards technicians C. G. Gordon and J. C. Richardson, under a project sponsored by the National Advisory Committee for Aeronautics, the gaging procedure was outlined at the recent 22nd Annual Meeting of the American Ceramic Society.

► **Making**—Essential elements of the gage are a small probe coil, inductance measuring system, and a device for positioning the coil and measuring its distance from the test surface.

Probe coil is housed in a cylindrical plastic test head mounted in a heavy gage stand giving controlled movement of the test specimen in relation to the coil. A plastic fusible element extends easily through the coil to a dial gage.

A cabinet houses the electronic components of a 900 kc oscillator and the bridge-type inductance measuring system connected to the test head by shielded cable. Bridge balance is indicated by a sensitive galvanometer.

► **Measuring**—The instrument depends on the measurement of a field distance between coil and surface, regardless of the existence of the ceramic coating. The latter has a negligible effect on the electrical field at the frequency used.

First, the instrument is calibrated on an uncoated specimen similar to the coated part under consideration. The reference specimen is used by the gage stand table until the former's surface contacts the dial gage indicator. The dial gage is set at zero and the bridge circuit adjusted so that galvanometer reading is zero. This establishes, for reference, the probe coil inductance in relation to the uncoated specimen.

The table is now dropped and the coated part substituted for the uncoated. The table is moved until the galvanometer reads zero, and the dial gage then gives the coating thickness directly.

► **Range**—The device is designed to measure coatings up to .090 in. thick. When the coil is within .010 in. of the metal surface, the inductance bridge sensitivity is about the same as the conductivity of the mechanical dial gage reading. In this case, the thickness indicated on the dial gage is correct within .0002 in.

However, when the coil is 10 in. from the metal surface, readings may be in error by as much as .001 in.

Tests show that variations in size and shape between coated and uncoated specimens are not important unless thickness is less than .010 in., measurement width less than .5 in., or the measurement is made within .25 in. of an edge.

For accuracy with coated specimens, both reference and test unit must have same reference.

Size of test material—nonmagnetic or only weakly magnetic—produces magnetic scales with coatings, say magnetic mea-

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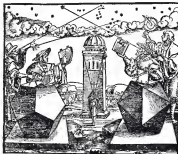
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INDUSTRY CIRCLE 1311

Written in the Stars

For centuries, man has looked to the universal constellations, the stars, to establish his location on the earth's surface.

The advent of modern, high-speed aircraft, however, raised a new problem in celestial navigation—that of plotting, accurately and accurately, the position of a rapidly moving object. Time-honored nautical methods proved inadequate.

The recently developed Kollsman Panoramic Sextant, with special automatic evener, enables the airborne navigator of high-speed craft to obtain a series of extremely accurate sights. It also eliminates the need for an astrodom.

The Panoramic Sextant reflects Kollsman leadership in the fields of precision instrumentation and fine optical systems. The same high standard of manufacturing and engineering skill marks the complete Kollsman line of Sine wave, spot, and open beamscopes. No finer pneumatic beamscopes are made.

KOLLSMAN AIRCRAFT INSTRUMENTS

SQUARE D COMPANY

arrived at the component interface or in the coating will cause inaccurate results.

• **Capacity**—The impedance bridge used is reported particularly suitable, since variations in the probe coil inductance are indicated without separate balancing of resistive and inductive components at the bridge voltage. This is an advantage in thickness measurements because impedance variations are usually much larger than the accompanying resistance variations.

The Kofler oscillator employing the bridge circuit employs a dual triode in push-pull. A peak-to-peak voltage coil, consisting of a crystal diode in series with a capacitor and resistor in parallel, is connected across the probe coil. The d.c. voltage across the capacitor is constantly equal to the peak a.c. voltage drop across the probe coil and, since the probe-coil current is determined principally by a large series resistance, this voltage is effectively proportional to the probe coil inductance.

To obtain a comparison voltage with the same source of resistance variation as the probe voltage, a reference coil is arranged in a similar circuit and fed from the same oscillator through a variable resistance, which may be adjusted to equalize the a.c. voltage drops for both coils. The sensitive galvanometer, protected against overload by two crystal diodes in shunt opposition across the meter, indicates any imbalance between these two bridge branches.

Checks Audio Gear

An accurate ear and voice are now testing landmarks and microphones at United Air Lines' maintenance base at San Francisco.

This new procedure for checking these essential elements of aircraft radio systems is in better faster than previous methods, according to W. C. Munster, UAL, general manager of engineering.

The "voice" is an audio-oscillator which reproduces the entire range of conventional voice frequencies. In use, the microphone is clamped against the voice, and is fed conventional tones. These are transformed through circuitry into a trace on the display tube of a cathode-ray oscilloscope.

A permanent trace is printed on the face of the tube to serve as a standard for checking, so that visual matching of the permanent and temporary trace is all that is necessary for checking.

For headset testing, the procedure is somewhat reversed. The headset is made to broadcast sounds into the microphone, and zero the permanent trace is used for a standard of comparison.

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Many difficult retrofit power application problems are being solved most satisfactorily by using these hydraulic motors to produce highly efficient rotary motion.

Vickers Aircraft Hydraulic Motors have a very high horsepower/weight ratio... some models deliver as much as 2 1/2 hp per lb. The other motor models in this group are as small as 1/2 lb. Because of the low inertia of moving parts, these hydraulic motors can be started, stopped and reversed almost instantaneously... making them particularly well suited for positioning devices where accurate control is needed. No starters or brakes are required on these Vickers motors once they are stalled indefinitely in any position without damage. Shoring or calked levers can be applied. No cutting levers or clamps are required. They will not cause valve interference.

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SALES & SERVICE

Gulf Program

Training scheme will stress car service techniques at field.

Better airport service for the general pilot is the aim of Gulf Oil Corp.'s new training program covering over 500 independent airport dealers in 17 states. An attempt will be made to adapt present techniques and mechanics used by Gulf automobile service stations to airport use.

The program was tested in a small scale last winter in southern divisions and worked out so successfully it is being extended throughout the company's 114 sales districts.

Special booklets, credit cards, signs and sales aids have been prepared for distribution to dealers. Each Gulf sales division will contact dealers at its own office and thoroughly brief them on the program. At the same time the company will put its representatives through a training program to brief them on the dealer's problems.

Service stressed—Gulf will ask its airport dealers to adapt a systematic routine for checking all service points on transient planes even to spring strappings from the baggage. Clean and accurate and attractive shop appearance will be stressed. Dealers are being urged to handle luggage, break out tools, pump, empty ash trays and check tires to build repeat business.

Dealers will also be asked to put their location in a standard uniform designed by an Atlanta manufacturer who franchises Gulf with automatic cashiers.

See Big Year For Spray Dusters

Entomologists agree that bugs will be especially busy this year. That means spray/dust operations will be put at busy.

Requests as far as 1950 for water emulsions from C.A. (preventing low altitude spread and being considerably higher than for 1949), the previous record year. In entire 1949 285 women were granted as far as year 1948 have been usual and the bulk are still to be listed from the Agricultural Dept. records and that about 600,000 acres of Northeastern U. S. forests will get the anti-grass moth treatment via plane, compared

with 400,000 acres covered last year.

In the Northwest, primarily Washington and Oregon, plans call for treating at least 1 million acres in against 500,000 acres in 1949. Special flight strips have already been laid for the planes which will handle the job.

And throughout the "grasshopper belt"—the western plains area from the Canadian border to Mexico, some 2 to 2.5 million acres are going to be poison baited. While the area to be covered remains the same as last year, indications are that it will be some more extensively in 1950.

ADMA Plans Selling Manual

A manual to help aircraft dealers sell more planes will be distributed in September. (See page 16 below.)

The outline, sponsored by the Aviation Distributors and Manufacturers Assn., is intended to cover all aspects of plane ownership in one handy volume. It will supplement the sales literature prepared by individual aircraft builders.

ADMA originated the idea for such a sales tool last December and plans to put out an initial printing of about 6000 copies. The volume will measure 9 x 12

in. and will be on two-color. It is being laid out so that a dealer will be able to get a prospect a complete picture, including an owner's manual and advantages, in as little as five to ten minutes. Included will be complete analysis of operating costs of 2 place, 4 place, 6 place and two-engine craft.

William D. Stokesser, vice-president of Aero-Penn, Inc., New York advertising firm, is supervising production of the volume for ADMA.

BRIEFING FOR DEALERS AND DISTRIBUTORS

◆ **Seagull Approach**—CAA has approved the Seagull 138, 140 and 140A, for 140 model 1400 floats, smaller and lighter than model 1400 floats in which the Seagull was previously approved. Increased performance is possible using the smaller float gear.

◆ **Five Fine Flyers**—A number of business and aviation groups have joined together in North Carolina to sponsor a 5-day aviation tour (Golden Moments) Airport, July 23-27, to display aircraft products. Interior and exterior design space for state and flight demonstrations will be available. To ensure maximum public interest there will be no admission charge. For further information write: H. N. Henderson, Civilian Aeronautics Assn., Inc., at the municipal airport.



ADMA PERUSES NEW SALES MANUAL

Officials of Aviation Distributors and Manufacturers Assn. study new sales manual of new plane sold manual being prepared for use by distributors to attract owner operations later this year. George Galtman, chief area of ADMA's national committee (right) points out main features of the manual.

Looking on are G. B. Van Dine, ADMA president; Van Dine, ADMA secretary; George W. Brown, ADMA vice-president; and Robert W. Richardson, ADMA vice-president. Also present are: Donald Richards, ADMA executive secretary.

FINANCIAL

Aircraft Shares Pay More, Faster

Trend in industry this year indicates larger and more frequent dividends paid to stockholders earlier.

Aircraft companies are paying dividends to stockholders earlier, more frequently and in greater amounts this year.

Grumman Aircraft Engineering Corp. continues to set the pace in dividend payments among the aircraft builders. Following its dividend of \$1.00 per share earlier this year, the company paid a like amount on July 1, bringing total payments for the year then to \$2.00.

Last year, only two dividends were paid, \$1.00 each, on the second and third payment dates. The second dividend did not take place until late in the year. The same account was paid during 1945 with the same pattern of timing. Accordingly, the company's present action in making a second dividend payment as early as the year supports the expectation that still another dividend will be made before 1950 a year ahead of the year dividend of \$1.00 per share was paid, this will make a total of \$3.00 per share during 1946, the highest in Grumman's history.

Never a Miss—During the entire 19 years of its existence, Grumman has earned a profit every year and made dividends to stockholders annually. This is a unique record in the aircraft industry.

Of course significance, the record shows that once Grumman raised its dividend rate it was maintained at that level until again increased. Based on the present capital stock outstanding, annual payments were made at the rate of 75 cents per share during 1944 and 1945, increased to \$1.00 per share for 1946, stepping up to \$1.50 per share in 1947 and again to \$2.00 each in 1948 and 1949.

The Grumman management has never indicated any of its dividend decisions is as quarterly or semi-annual. It has invariably followed the course of expense in its dividend policy. In this manner, the established background of continuous payments has been most reassuring to stockholders, removing much uncertainty.

Fair Prospect—Fairchild Engine & Airplane Corp. declared a dividend of 20 cents a share during the first half of 1946. The management indicated that it would consider another dividend later this year. With a new management in control, the company paid 35 cents a

share in November, 1946, for the sole dividend of that year. This represented slightly more than one-half of the year's available earnings.

Consistent to a more liberal dividend policy, if earnings permit, the present management is likely at least to equal the recent dividend determination later this year.

The 1946 Fairchild Engine & Airplane Corp. dividend was the first since 1945, when 20 cents per share was paid—the same in 1944 and 1945.

Republic Aircraft Corp. came through with a surprise payment of 15 cents a share in April of this year. This company completely omitted its stockholders from 1947 through 1948, in 1949. Thus by this time, a dividend of 15 cents per share was made in 1946, and 50 cents for 1945 and 1944.

Liberal Dividends—Douglas Aircraft Corp., the industry's most liberal dividend payer during 1946 in comparison to available earnings, continues its policy of making quarterly distributions of \$1.25 per share with extra.

Thus for an 1946 fiscal year, the company has paid a total of \$4.75 per share, representing two quarterly periods. The question of subsequent extra dividends will presumably be considered as the year is completed. During the 1947 fiscal year, Douglas declared a total of \$6.25 in dividends compared with available earnings of \$9.19.

Lockheed Aircraft Corp. appears to have regular quarterly dividends, despite fluctuating levels of its earnings.

The company paid a regular dividend at the rate of 10 cents per share quarterly throughout 1943, 1944, 1945 and the first half of 1946. Dividend payments were suspended during the second half of that year and during all of 1947. Distributions to stockholders were resumed in 1948 with three payments of 50 cents each per share. A total of \$2.00 was paid last year. So far in 1946, two quarterly dividends of 50 cents each have been made.

Debt Liquidated—Lockheed completely liquidated all its debt earlier this year, leading to the expectation of higher dividend payments in the light of anticipated higher earnings. But a profit for the company may wish to have most of the year's results liquidated

before considering a revision of established dividend policies.

North American Aviation recently declared another 25 cents per share dividend following payment of a like amount last December, a total of \$1.25 per share for the current fiscal year compared to the same amount, but the fiscal year ended Sept. 30, 1946.

Living off its Fat—The dividend policy of Curtiss-Wright management in its common stock this year has been placed in doubt by voluntary dividends emanating from the company. Nonetheless, the rate of 25 cents quarterly established during 1947 has been maintained during the first half of this year. These payments of 1949 and 1950 were made despite the lack of earnings during this period in every week but one. Such payments are much possible through the accumulated earnings of the war period.

So the annual dividend of \$2.00 per share is being made at quarterly intervals in Curtiss-Wright's "A" stock.

In recent years, United Aircraft Corp. has appeared to follow a policy of paying semi-annual dividends of \$1.00 each. During 1949, a total of \$2.00 was made in the manner, the same as in 1948. A payment of \$1.00 per share was made in June of this year on the company's common stock.

United Aircraft paid dividends at the rate of \$3.00 per share in 1942, 1943, and 1944. This was reduced to \$2.00 per share in 1945 and \$1.00 in 1946, with an increase to \$1.25 for 1947. The next payment—\$4.00 a share—takes place during 1948.

Beck, Kessau—Beck Aircraft Corp. which paid a total of \$1.00 per share in dividends during its 1949 fiscal year, has declared two quarterly dividends of 20 cents each covering the first half of its current 1950 year. The management appears to have maintained a liberal dividend policy in part periods in relation to available earnings. During 1946, it also paid a total of \$1.00 per share in its stock, the same rate as paid during 1942 through 1945, inclusive.

Borg-Warner Corp. paid \$1.00 per share earlier this year for its sole payment of 1950. This compares with a total of \$2.00 per share during 1945 and a \$1.00 each from 1942 through 1944. It would appear that the company is likely to take additional dividend action before 1950 is over.

Thus far, Bell, Cessna, Convair, Martin, Northrop and Ryan have failed to make dividends this year.

To many investors, however, it is encouraging to see a more liberal dividend policy being pursued by aircraft manufacturers. Sustained levels of earnings coupled with regular dividends should mean that good aircraft equities are earned sooner. —Selig Ahtschi

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The rugged construction and all-around economy of Chevrolet P-L trucks cut operating and repair costs—let you deliver the goods with real reduction in cost per ton per mile.

P* Price Leaders

The Chevrolet truck line is the very lowest priced line in the field—over on initial cost. What's more, P-L trucks give owners dollar and cents savings in maintenance and operation.



AIR TRANSPORT

Space to Spare Despite Holy Year

U. S. trans-Atlantic scheduled carriers, disappointed in summer traffic, blame CAB exemption of irregulars.

Tourist and Catholic Holy Year air travel between the U.S. and Europe has helped to live up to some of its optimistic advance billing.

With seat capacity up sharply over last year, U. S. flag carriers say they have plenty of space for passengers even during the peak summer season. And they are open directing flight criticism at the Civil Aeronautics Board for permitting unscheduled operators to dilute scheduled airline business with scores of lowfare charter flights (Aeronautics Week May 27).

■ **Enter Alleged-TWA**, which stands to benefit most from Holy Year traffic to Rome, has called on CAB to reconsider its decision permitting 80 to 100 U.S.-Europe group charter monthlets by irregular carrier. It says the Board's move was based on mistaken assumptions regarding the trans-Atlantic traffic situation this summer and adds that exemptions went beyond the agency's power under the Civil Aeronautics Act.

"Although it was generally anticipated that 1970 transatlantic traffic would greatly exceed 1969 because, on such count is evident," TWA declared in the first five months of 1970, TWA flew a total of 12,695 transatlantic passengers up slightly over the 12,887 carried in the same period last year.

The small gain in 1970 volume is due almost entirely to the 15-day bus-motels-traveler's camp rates in effect

during the first three months of this year, TWA continued. "In April and May," TWA declared, "we actually carried 180 fewer transatlantic passengers than in the same two months of 1969."

■ **Space Available-TWA's** trans-Atlantic traffic for June and July was expected to exceed that of the same two months last year. Even so, it reported several thousand empty seats available in late June and July, and 15,000 seats scheduled south in July, August and September.

Pan American Airways also reported seats available. PAA said it carried 6,938 eastbound trans-Atlantic passengers during July and August last year. Space available on PAA for the same two peak months this year could accommodate 10,000 additional passengers.

[CAB says the unusual international situation could change this picture overnight. U.S. tourists in Europe might choose suddenly for homebound-bound space, necessitating emergency eastbound passenger and cargo shipments.]

■ **Flights Cancelled-TWA** says late spring bookings were at far below expected levels. It says it was necessary to cancel 12 flights either actually scheduled to operate in June or tentatively scheduled in extra sections in that month. These cancelled flights had an aggregate seating capacity of 11,127.

Flights tentatively scheduled at extra sections in July were also cancelled.

[A different note has been sounded

by British Overseas Airways Corp., which claims advance North Atlantic bookings are at least double last year's level.]

TWA and CAB offered no pool to support its view that passenger carried in groups by irregular carriers pursuant to the Board's exemption orders are financially unable to pay the standard fares for individual travel. To prove that CAB's selective-payer argument was wrong, TWA cited these facts:

On Apr. 3, TWA had 2,315 eastbound fare bookings for June. On May 29, TWA's fare bookings for June, including all new bookings made in April and May, had declined to 975—a net loss of nearly 1,400.

Most of these fare cancellations, TWA contends, will be covered by irregular carriers in the 4,000 seats authorized by CAB on May 26 and the additional flights granted the charter operators in June.

Rome thus does not tell the full story of demand by the irregular carriers, TWA declares. It explains that fare passenger figures do not include travelers who were not originally booked on TWA but who would have traveled on a TWA plane or on ordinary TWA passengers, if the needed service were not available.

■ **Loss Estimated-TWA** estimates that even if only 25 percent of the passengers transported by unscheduled operators were diverted from the eastbound section the latter's revenue losses would be around \$750,000. Result may be a need for more mid-pay to make up the difference.

CAB has given no indication that it will back down from its decision pointing the irregular operators exemptions for trans-Atlantic group charter flights. In fact, the Board has authorized a number of trips in addition to the 12 permitted by the May 30 order.



SAN FRANCISCO'S PLAN FOR AIRPORT

A \$4,000,000 international airport for San Francisco is shown at minimum. The building's design calls for separation of arriving and departing charter passenger traffic so that passengers departing from planes leave the airport on the lower level, and those

be handled continuously outside. There will be access stairs, with the top two for alternative problems and control tower. There is being asked upon by CAB and the San Francisco Air Commission. Aircraft and airplanes are William F. Day.

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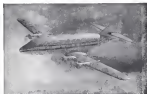
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PROPELLER TURBINES

Last month, the Federal agency gave the Flying Tiger Line permission to make a maximum of eight additional U.S. flights, flying around the world, and to add to its fleet of Douglas and Lockheed aircraft, and to add to its fleet of Douglas and Lockheed aircraft, and to add to its fleet of Douglas and Lockheed aircraft.

Transamerica Airlines was permitted to operate four flights between Los Angeles and New York under its International Airline Operators contract.

that last year. It believes TWA's and American's coach services are definitely beating the airlines.

But here's how some of the scheduled airline executives view the present situation.

• James P. McGowan, Republic Air-Czech (Czech agency) official and former vice president of Standard Airlines, which CAB put out of business last year: "The CAB of TWA and American in the coach field has affected us very much. They have absorbed some of the coach business we developed. But the added competition has generated more business."

"The transcontinental coach market is still far from saturated. Load factors are as good as last year. During the rush season we are running about 10 percent of the number of passengers we carry."

"Scheduled airlines haven't cut deeply into our business because we developed a new and different service. People fly with us who wouldn't make the big airlines."

"Our transcontinental coach service actually generates a lot of traffic for the scheduled airlines because our

Nonsked Lines Calm in Crisis

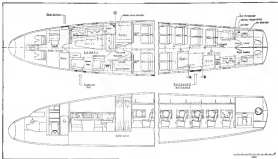
Not scared by scheduled airline's swoon competition, they say; CAB poses the more real threat.

Los Angeles-Nonscheduled airlines based on the west coast are maintaining an outward focus in the face of the Civil Aeronautics Board's increasingly severe restrictions on their operations (AVIATION WEEK June 12).

Despite gloomy forecasts that they are reaching the end of their rope, the regulators claim business is wonderful. They say they haven't been hurt at all by TWA's and American Airlines' entry into the west coast coach field. "Nothing to Lose—Some of the California nonscheduled airlines are in a position to open—possibly on the theory that they have nothing to lose by violating

regulations since CAB is trying to get them out of business anyway. Although CAB has proposed limiting the number of flights between Los Angeles and New York, and between other major cities to three trips per month, at least one west coast nonscheduled operator reportedly is meeting the requirement of a daily transcontinental service.

Some operators by key routes of flight to the contrary, many nonscheduled airlines employ the unrestricted service but do not have the large airports they may be requested. One company that keeps planes to schedule says there is just demand for equipment



Capital's Constellation with built-in comfort

"It's the way the plane's built," says Capital's Constellation. "That's the way I, H. G. Galt, Capital Airlines chief engineer, feels about the new 'luxury liner' the company will soon receive—the first domestic Constellation with a full-fledged lounge."

Capital expects to take delivery of one of these 55-passenger aircraft from

Lockheed during July and August. Features of the \$18,000 aircraft: • Super-thick carpeting • Air-conditioned cabin • Most efficient cabin insulation of any domestic Constellation (according to Capital). • Extensive decoration will follow some general pattern as Capital's current

DC-4s. The tops will be painted white to reflect intense temperatures.

The planes will be equipped with new overhead, floor-to-ceiling, built-in and fold-down cabin luggage racks.

First schedules will be between Washington Chicago and New York Chicago.

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Airports Advisory Group Meets

Several important recommendations and conclusions affecting airport space have been formulated at the third annual meeting in Miami of the Airports Advisory Committee of the Civil Aeronautics Administration.

The group recommended three areas for government action:

- Give individual consideration to straight approach or 180-degree traffic pattern at controlled airports
- Extend coverage statistics and aid voice identification
- Reserve two-way radio for aircraft in certain designated areas
- Impose stringent regulations on open areas of runways

The meeting directed plans to make airport programs more flexible, reduce staffing rates, and free services. With an eye on long-range airport design, the group also considered changes that may be required when airlines start using jet and multi-engine aircraft.

A full exposure of these facts will be made at a luncheon at CAA's next meeting, which would permit CAA to contract and operate helicopter bases or to use government buildings.

A liaison official has been named to work with federal agencies to help determine highway traffic bottlenecks at airport approaches.

CAA is adopting its communication policy that only emergency safety and traffic control messages will be provided without charge, but airlines will be permitted to transmit messages for a fee.

The meeting concluded that domestic airlines rapidly are becoming strong enough financially to justify making its own development of radar for civil aviation a still \$18 million effort, and that the use of jets and multi-engine aircraft will require strengthening, rather than lengthening, of runways.

Five Lines Arrange For Idlewild Space

The Port of New York Authority has authorized lease arrangements for space in three hangars and adjacent plane parking and auto areas with Pan American, American Overseas, North-west, British Overseas Airways and Trans World Airlines. Minor details are yet to be agreed before signing of the leases. The contracts are expected to move in about July 1.

Present plans call for PAA to take 75 percent of Hangar 3 and BOAC the remaining 25 percent. AOA will take 75 percent of Hangar 4, NWA 25 percent, TWA will occupy 75 percent of Hangar 5 and NWA the remaining 25 percent.

Hangar leases are based on a rental of \$1.65 per sq. ft. for hangar and shop space on the first floor, \$1.25 on the second floor, 22 cents for plane parking and apron area, and 25 cents for auto parking.

Permits for counter and office space will run for five years at a rate of \$6 per sq. ft. for counter space, \$10 for first-floor office space, and \$1 for second-floor office space.

PAA will occupy about 450 sq. ft. of counter space and 4450 sq. ft. of office space. AOA 553 sq. ft. and 5540 sq. ft.; NWA 192 sq. ft. and 1279 sq. ft.; and BOAC 210 sq. ft. and 2306 sq. ft.

TAL Contract

Tenneco Air Lines has been awarded a Navy contract worth \$720,450 for experimental track and land-based flying at Naval Petroleum Reserve No. 4 of the Arctic Circle. Tenneco will conduct a special test of planes for the job.

trols), British Overseas Airways Corp., Canadian Pacific Air Lines, Philippine Air Lines and Civil Air Transport (China).

Permits Urged for Cuba-Fla. Carriers

Four Cuban airlines have been recommended for longer air carrier permits authorizing flights between Havana and Florida ports.

Civil Aeronautics Board Examiner Paul Pfeiffer has urged that:

- Aerovías "SQ" be authorized to carry persons, property and mail between Havana and Key West for an additional five years (expiring July 10, 1955) and permitted to carry persons, property and mail between Havana, St. Petersburg and Tampa, Fla., for three years.
- Compania Cubana de Aviación should be authorized to carry persons, property and mail between Havana and Miami for an additional five-year period expiring Apr. 4, 1958.
- Cuba Aeronaval should be authorized to carry persons, property and mail between Havana and Miami for a period expiring Apr. 4, 1958.
- Servicios Aereos should be authorized to carry property and mail only between Havana, St. Petersburg and Tampa for three years.

Expansive Aero Inter-American's application for renewal of its Havana-Miami permit should be denied since the carrier has not proved it is still fit, willing and able to conduct the service.

SHORTLINES

► **Air Transport Assn.**—WAA make cash awards totaling \$300 this year for research in weatherology and dispatching by employees of ATA member airlines. Rules have been formulated so that research conducted by pilots, meteorologists and dispatchers in collaboration with supervisory personnel can qualify for prizes. Papers with detailed reports of research work and conclusions must be mailed to ATA in Washington not later than Dec. 31, 1951.

► **Air Tamer, Inc.**—The small irregular operator again this summer will use first 10-motor aircraft for flights between Ohio points on Lake Erie's southern shore and airports in the lake. It has been conducting similar service for over 20 years and currently holds a post office contract to carry mail on an air route made in the area. By special CAA exemption the company will make passenger flights to Pelee Island, Canada, until Sept. 15.



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*—the Red Elastic Collar effectively seals
against liquid and gas pressures...assures REUSEABILITY!*

Again, ESNA has met the demand of airframe and component manufacturers — providing an extra high, light weight, all-metal cap, for the ESNA hex and anchor nut types shown above, with sufficient cap height to insure full clearance for AN-3 and AN-4 bolts or AN-509 screws.

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And, like all Elastic Stop Nuts, the new ESNA K3's provide dependable protection against vibration . . . do not damage bolt threads . . . and maintain precise adjustments, even after repeated re-use.

HERE'S A CHALLENGE: Send us complete details of your toughest bolted trouble spot. We'll supply test nuts — FREE, in experimental quantities. Or, for dimensional data sheet on the K3 line, write: Elastic Stop Nut Corporation of America, Union, New Jersey. Representatives and Agents are located in many principal cities.



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